



Fort Donelson National Battlefield Water Quality Summary Fiscal Year 2010

Water quality at Fort Donelson National Battlefield Park remains good.



High water receding from May 1-2 rains at Lake Barkley, May 11, 2010. Image by Brenda Wells.

The Cumberland Piedmont Inventory and Monitoring Network began long-term water quality monitoring at Fort Donelson National Battlefield in fiscal year 2004. Water quality is measured quarterly on alternate years at five sites; Lake Barkley at the overlook, Hickman and Indian Creek Embayments, Hickman Spring and Indian Creek at Graves Battery. While the park is nearly surrounded by water (the spillway elevation of the Lake Barkley Dam defines the boundary along the US Army Corps of Engineers operated lake) the two latter sites are the only perennial waters within the boundaries of the park. We consider it efficient to monitor adjacent waters due to their immediate aesthetic importance while collecting park waters. Based upon program requirements and findings of the water quality inventory, a set of parameters was chosen for long-term monitoring; including the field measures of water temperature, specific conductance, pH, and dissolved oxygen (DO). Samples were also collected for analysis for *Escherichia coli* (*E. coli*).

Highlights of Fiscal Year 2010 Monitoring

Water quality values were reflective of the wide range of flow conditions encountered during the year – from the typical low flow of autumn to a large flood event in May. DO levels in Hickman Spring were below the lower limit of 5.0 mg/l on two of the four samplings. This should be considered a natural condition and not a true violation of state standard as the low DO was due to extremely low flow conditions. Other exceedances of state limits were external to the park. DO in the embayments dropped below the lower limit following the May flood as warm weather combined with stagnant backwaters combined to lower oxygen levels. DO at Lake Barkley dropped just below 5.0 mg/l during the exceptionally warm August sampling event – where all three external waters exceeded the 30.5°C standard. *E. coli* values for the May sample at Lake Barkley was 913.0 Most Probable Number (MPN)/100ml – nearly double the

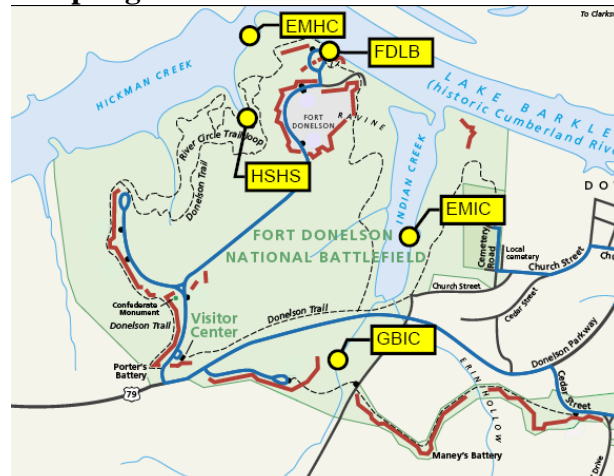
state standard of 487 MPN/100ml. This high level is the result of the record floods ten days prior.

Water Quality Standards

All park waters are considered “Exceptional Tennessee Waters” which prohibit discharge and other pollution sources, while criteria are defined as Tennessee’s “Fish & Aquatic Life and Recreational” standards, a combination of the highest standards under the Clean Water Act as promulgated by the state. Specific Conductance is without state standards or federal guidelines but is useful in interpreting water quality results.

Water Temperature	Not to exceed 30.5°C
Dissolved Oxygen	Not to exceed 5.0 mg/l
pH	Between 6.0 and 9.0 SU
<i>Escherichia coli</i>	Not to exceed 487 MPN/100ml
SpC	No Standard

Sampling Sites



EMHC	Hickman Creek Embayment*
FDLB	Lake Barkley at Overlook*
HSHS	Hickman Spring
EMIC	Indian Creek Embayment*
GBIC	Indian Creek, Graves Battery

*Denotes sites outside park boundary

Future Monitoring

Water quality sampling is scheduled to resume in fiscal year 2012.

Water quality data are available upon request to the Cumberland Piedmont Network or our website:

<http://science.nature.nps.gov/im/units/cupn/reports.cfm>